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THE FINDING OF THE QUEEN OF THE ARMY ANT *ECITON HAMATUM* FABRICIUS¹

WILLIAM MORTON WHEELER.

After the peculiar, large-bodied, wingless females, or queens of the army ants of the American tropics belonging to the typical subgenus *Eciton* had been sought in vain for many years by many collectors I finally succeeded in July, 1920, in securing two queens of *Eciton burchelli* Westwood in British Guiana, and the same year published an account of their capture.² Since that time the queens of three other typical *Ecitons* have been discovered in rapid succession. In August, 1920, Mr. F. M. Gaige took the queen of *E. vagans* Roger in Colombia, but has not yet described the specimen. In 1923 Dr. Carlos Bruch published an account with fine figures, of a queen of *E. dulcius* Forel, subsp. *jujuensis* Forel, which he took in the Argentine.³ He has also described a queen of *Eciton hetschkoi* Mayr, captured by Weiser in July 1923 in the same country.⁴ The latter is not, however, a true *Eciton*, but belongs to the subgenus *Acamatus*, which occurs also in our Southern United States, from which I have described the queens of three species (*schmitti* Emery, *opacithorax* Emery and *carolinense* Emery). More recently Reichensperger has published a description of the queen of *E. quadriglume* Haliday, from four specimens taken by Franciscan brothers on the Rio Negro, Brazil in the fall of 1923.⁵ This *Eciton* is very closely related to

¹ Contributions from The Entomological Laboratory of the Bussey Institution, Harvard University, No. 244.

² "Observations on Army Ants in British Guiana," *Proc. Amer. Acad. Arts and Sci.*, 56, 1921, p. 291-328, 10 figs.

³ "Estudios Mirmecológicos," *Rev. Mus. de la Plata*, 27, 1923, p. 172-179, 1 pl. 8 text-figs.

⁴ "Descripción de la reina '*Eciton (Acamatus) Hetschkoi*' Mayr," *Rev. Soc. Argent. Cienc. Nat.*, 7, 1924, p. 232-235, 2 pls., 4 figs.

⁵ "Das Weibchen von *Eciton quadriglume* Hal., einige neue ecitophile Histeriden und allgemeine Bemerkungen," *Zool. Anzeig.*, 60, 1924, p. 201-213, 5 figs.

dulcius. Among the few remaining species of true *Eciton* of which the queen has persistently eluded capture is *E. hamatum*. During the past summer (1924) I was fortunate enough to secure a beautiful specimen of this insect from a bivouacking colony just behind the new tropical laboratory on Barro Colorado Island in the Panama Canal Zone. This find is, perhaps, the more important because *hamatum* is the type of the genus and because it has such a wide distribution (from Brazil to Mexico) and is so common that its raids have been noticed by nearly every zoological explorer in tropical America. It is, in fact, among the more than one hundred described species of *Eciton*, the one which has been longest known and most often cited in the literature since Fabricius first described the soldier in 1781.

At 8.00 A.M. on August 1st, after a heavy rain on the preceding day, while collecting behind the laboratory I encountered an army of *Eciton hamatum* foraging along the central trail (Fig. 1) and in the adjacent jungle. The workers were plundering numerous nests of ants (*Pheidole*, *Acromyrmex* and *Camponotus* species) and carrying away their helpless larvæ and pupæ. On one of the tall trees they had found a large nest of a yellowish wasp (*Polybia* sp.) and for some hours were bringing in the brood in great quantities. Dr. Curt Richter devoted the morning to watching the files, computing their rate of movement and the nature of their prey. By following the various converging columns we eventually located the colony which was bivouacking less than a hundred yards from the laboratory near the edge of the jungle. The great mass of ants presented an astonishing spectacle (Fig. 2). They had selected the base of a small tree, which, about 15 inches above the ground, was joined to the trunk of a young stilt palm by a looped liana and some twigs, together forming a horizontal frame. The larger tree trunk was inclined to the north so that the surface of the bark and the ground beneath were quite dry. In this spot, which had evidently been sheltered from the heavy rains for several days, the ants had congregated in a compact, cuboidal mass, 13 to 15 inches high and broad, and suspended from the frame above mentioned. Dozens of large workers hung by their claws from the twigs and supported solid clusters and curtain-like sheets of workers and soldiers, the



FIG. 1. Entrance to the central trail through the jungle on Barro Colorado. The Ecitons were foraging along this trail. Their suspended swarm (shown in Fig. 2) was situated in the jungle a few hundred feet to the left. Photograph by Dr. David Fairchild.

latter dotting the somber mass of intertwined brown-red bodies, legs and antennæ with their large shining, ivory-white heads. The mass hung down to the ground but left a small opening at the bottom on the west side, a kind of portal, through which the



FIG. 2. Bivouacking colony of *Eciton hamatum*. The minute white dots are the heads of the soldiers scattered through the suspended mass of workers. Photograph by Dr. Frances G. Smith.

converging bootyladen files of workers and soldiers were continually pouring to deposit their burdens in the center of the mass and on the ground immediately beneath it.

At my request, Miss F. G. Smith, who happened to be visiting the laboratory, kindly undertook to photograph the colony, and later Dr. Fairchild took a more enlarged flash-light picture. Considering the fact that the ants were clustered in a dark spot, the two photographs, which are shown in Figs. 2 and 3, give a good likeness of the shape of the cluster and of its composition. The blurred areas in Fig. 3 are, of course, due to the movements of several workers on its surface.



FIG. 3. Part of the suspended bivouacking colony of *Eciton hamatum* Fabr. on Barro Colorado Island. The interlacing legs and antennæ of the thousands of ants are distinctly shown. The white spots are the heads of the soldiers scattered among the swarm. About $\frac{1}{4}$ natural size. Photograph by Dr. David Fairchild.

Throughout the day the colony showed no essential change. It seemed very probable that the queen was concealed somewhere in the cluster, and although my enthusiastic young friend, Dr. Richter, wished to keep the colony under observation for several days, if possible, my arguments, inspired by fear that it might decamp during the night and disappear in the jungle and a desire



FIG. 4. Soldier and small worker of *Eciton hamatum* Fabr. Photograph by Dr. David Fairchild.

to secure the unknown female and any guests, or ecitophiles that the mass might contain, eventually convinced him and my other companions, Mr. Nathan Banks, Dr. David Fairchild, his son Graham, and Mr. Frederick Burgess that it would be advisable to kill the whole mass and sort it over carefully at our leisure. The opportunity was, indeed, exceptional, because bivouacking colonies of army ants are rarely seen and when one is encountered it is almost always in some inaccessible place, in or under a large log, in a hollow tree-trunk or a hole in the ground. The destruction of the colony, however, seemed to be a serious matter, both because it involved eliminating one of possibly only a few

colonies of the species on the island, which is an animal and plant reservation, and because it is not an agreeable task to tackle a populous colony of one of the larger Ecitons. Fortunately *hamatum* is far from being as vicious or from stinging as badly as *E. burchelli*, though the soldiers (Fig. 4) are able to run their recurved mandibles into one's skin in such a manner as to make them as difficult to remove as an equal number of fish-hooks.

Just before dusk we matured and carried out the following plan: A towel saturated with ether was tightly wedged into the bottom of a five gallon gasoline tin from which the top had been removed. After cautiously cutting away the main supports of the framework of twigs, the tin was suddenly inverted over the mass of ants, and at the same time one of the party sprayed those left outside the receptacle with "Komo," a preparation used for killing house-flies and mosquitoes. The whole mass of asphyxiated insects, which measured two and one-half gallons, and comprised many thousands of individuals, was then examined. The queen was found, together with a great number of nearly full grown worker larvæ, but no pupæ, a considerable amount of prey, mainly ant and wasp larvæ and pupæ, and a series of interesting ecitophiles. On the following morning the *hamatum* workers and soldiers, which had been out foraging when the main body of their colony was captured, were found to have formed four small compact clusters, each about the size of an orange at widely separated points in the jungle. As usual under such circumstances these meager remnants of a vigorous population had a demoralized and dejected appearance. In the course of a few hours they decamped and disappeared in the undergrowth.

The *E. hamatum* queen (Figs. 5, 6 and 7) measures 15 mm. (head, thorax and petiole 6.5 mm., gaster 8.5 mm.) and differs from the queen of *E. burchelli* Westwood in the following particulars: The color is uniformly ferruginous red, of a distinctly paler tint than in *burchelli*, and there are no markings on the gaster, except some brownish clouds on the middle of the second to fourth segments, near their posterior borders, and a few brownish spots on the fifth segment. The mandibles are shorter and slightly broader, the antennal funiculi longer and stouter, the cheeks more inflated, the antennal foveæ larger and more sharply



FIG. 5. *Eciton hamatum* Fabr. Female, dorsal view. Photograph by Prof. C. T. Brues.



FIG. 6. *Eciton hamatum* Fabr. Female, dorsolateral view. Photograph by Prof. C. T. Brues.

defined and the eyes slightly larger than in *burchelli*. The pronotum is longer and more narrowed anteriorly, the mesonotum less convex and not distinctly grooved in the middle, the tubercles

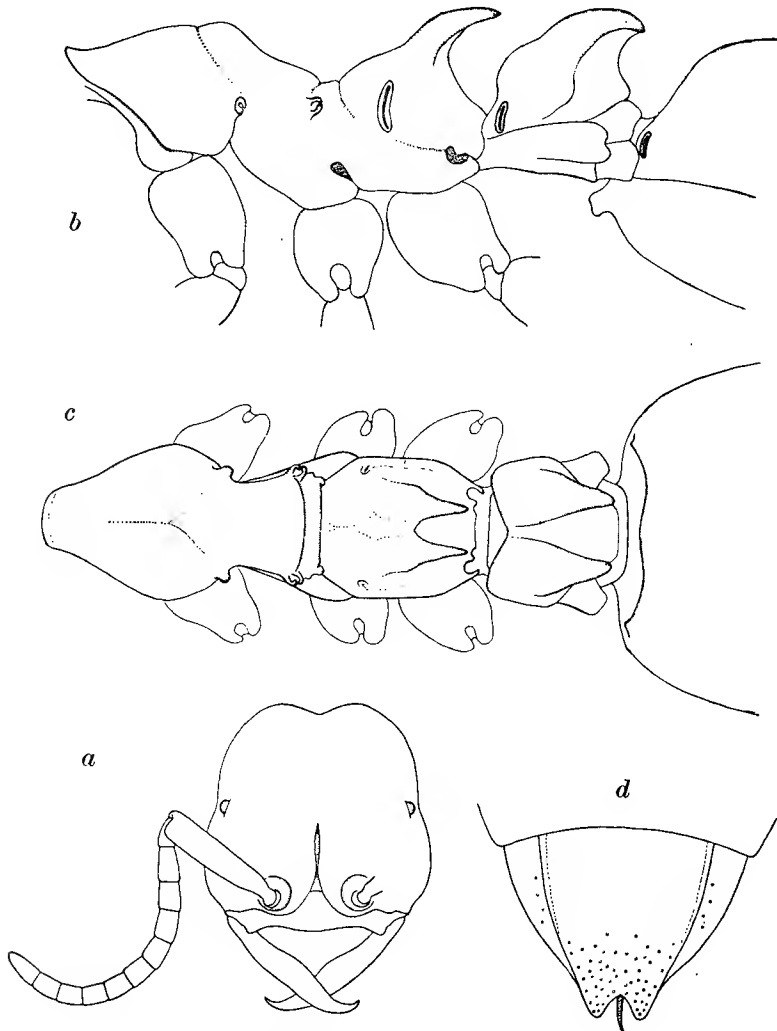


FIG. 7. *Eciton hamatum* Fabr. female; a, head, dorsal aspect; b, thorax and petiole in profile; c, same, dorsal aspect; d, hypopygium.

on the sides of the metanotum more pronounced. The horns on the epinotum are much longer and more pointed, those on the

petiole much shorter, blunter and more rounded than in Westwood's species. The surface of the body, even of the sides of the epinotum and petiole are subopaque, the coarse punctures on the thoracic dorsum are much as in *burchelli*, but those on the convex dorsal portion of the first gastric segment are larger and more scattered. The hairs are shorter, finer, less golden and decidedly less abundant, especially on the legs, which in *burchelli* are very pilose. Other structural details may be gleaned from the accompanying figures (Figs. 5, 6 and 7).

This queen is obviously in the same physiological stage as the two queens of *E. burchelli* described in my former paper. Owing to the small size of her gaster she must be either a young individual or, if the mother of the numerous larvæ, workers and



FIG. 8. Histerid ecitophile *Euxenister wheeleri* Mann, from bivouacking colony of *Eciton hamatum* Fabr. Photograph by Prof. C. T. Brues.

soldiers among which she was living, must have passed through a fecund period. The freshness of her color, integument and pilosity seems to support the former alternative. That the colony from which she was taken was not as large as some *hamatum* colonies I have seen, might also indicate that she was a young individual or one in which the gaster had temporarily returned to a contracted state after a first period (perhaps seasonal) of fecundity.

Of the eleven species of insects found in the bivouacking mass of *hamatum* workers and soldiers nine are Coleoptera, one a large Thysanuran (*Atelura* sp.) and one a mite resembling *Discopoma*. The beetles have been studied by Dr. W. M. Mann and Mr. H. S. Barber of the National Museum. The former writes me that there are five species of ecitophiles, namely two Staphylinids and three new species of Histeridæ. One of these is a *Troglosternus*, one a *Synodites* and the third, the remarkable form represented in Fig. 8, has been described by Dr. Mann as *Euxenister wheeleri*. The four remaining forms are bark-inhabiting or fungus beetles which were evidently brought in as prey by the foraging columns of ants. Mr. Barber identifies the specimens as a species of *Staphylinus* (*sensu lato*), two species of *Erchomus* and a *Rhymbus* (Endomychidæ). He sends the following note concerning the last, of which several specimens were taken: "The *Rhymbus* seems to be *Rh. hemisphæricus* Gerst. 1858, but not the species treated under that name by Gorham 1873 (Biol. C-A) although his *piceus* is perhaps a synonym of Gerstäcker's species. Unfortunately an earlier generic and specific name (*Bystus coccinelloides* Guérin 1857, from Colombia) is listed under *Rhymbus* Gerst. 1858, and from its original description I cannot see why this latter name should not apply to the Barro Colorado specimens. The species is new to the National Collection."